Immobilisation of an Iridium(I)complex onto a covalent triazine framework towards an efficient and recyclable catalyst for C-H borylation

Norini Tahir[1], Karen Leus[1], Fady Nahra[2], Steven Nolan[2] and Pascal Van Der Voort[1]
[1]Department of Inorganic and Physical Chemistry, Center for Ordered Materials, Organometallics and Catalysis (COMOC), Ghent University, Belgium.
[2] Department of Inorganic and Physical Chemistry, Ghent University, Belgium.

Covalent Organic Frameworks (COFs) are crystalline porous aromatic polymers with pure organic groups connected via robust covalent bonds. Since their existence, a variety of COFs has been constructed by utilizing different linkages such as boronate, imine, hydrazone and triazine moieties. The latter moiety is formed by a trimerization reaction of aromatic nitriles to triazine rings giving rise to the so called covalent triazine frameworks (CTFs). CTFs have attracted much attention recently as catalytic supports because of their high stability, large pore volume and high surface area [1]. In this study a bipyridine based CTF material was synthesized and employed as host material for the anchoring of an Ir(I) complex denoted as $[Ir(COD)(OMe)]_2$. The obtained Ir(I)@bipyCTF was characterized by a variety of techniques including nitrogen adsorption, elemental analysis, TGA, XPS and EXAFS. The results demonstrate the covalently anchoring of the Ir(I) complex onto the CTF material. Additionally, the Ir(I)@bipyCTF was evaluated in the direct borylation of aromatic C-H bonds which has emerged as a fundamental protocol in synthesis because it is an efficient and straightforward method for the synthesis of organoboron compounds [2]. The Ir(I)@bipyCTF material exhibited a good catalytic performance in comparison to other homogeneous Ir-based catalysts. Furthermore, the stability and reusability was examined demonstrating that the synthesized catalyst could be reused without significant loss of activity.

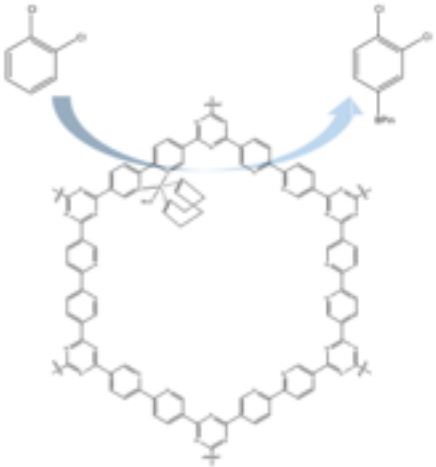

Fig: Ir(I)@bipyCTF in the direct borylation of heteroarenes

[1] Sakaushi, K. and Antonietti, M. Acc. Chem. Res. 48 (2015) 1591
[2] Manna, K., Zhang, T., Greene, F.X. and Lin, W. J. Am. Chem. Soc.137 (2015) 2665

E-mail: NoriniBinti.Tahir@ugent.be
www: www.comoc.ugent.be